Title: Dairy and Beef Biting and Nuisance Flies IPM Meeting Series

Project Leader:
Ken Wise, Eastern NYS IPM Program Area Educator, Livestock and Field Crops, Cornell University, klw24@cornell,edu

Cooperators: Cornell Cooperative Field Crop Extension Educators and Faculty

Type of project: Public Education

Project location: New York State

Abstract
A series of on-farm summer field meetings were held for dairy and beef producers to increase awareness of issues and IPM approaches to manage nuisance and biting flies on dairy cattle in and around confinement areas and for animals on pasture.

Background and Justification
Dairy production is an integral component of many rural communities in the northeastern US, helping to sustain the economic viability of our region. In New York, 5,700 dairy farms were in production in 2010 contributing nearly $1.6 billion in dairy products to the state's economy (NY NASS, 2010). In 1997, northeast U.S dairy and beef cattle associated revenues totaled $4.4 billion (USDA Census of Agriculture, 1997). Additionally, the value of these commodities in the eastern US, where the results of this project are most applicable, total $ 15.4 billion.

Biting and nuisance flies, and external parasites adversely affect animal health, productivity and reduce farm profitability. A complex of pests is usually involved, which can differ in the intensity of direct and indirect host effects. Damage from infestations of summer and winter active arthropod pests of dairy and beef cattle in the U.S. have been estimated to exceed $2.26 billion in losses annually (Byford et al. 1992).

In a 1997 survey of New York dairy farmers, twenty-eight percent of respondents indicated flies in and around barn areas were most difficult to control and 43% indicated animal confinement area flies were the most likely to cause economic loss (Harrington et al. 1998). Flies in and around the barn were treated with an insecticide an average of once a week. Most respondents (80-90%) employed cultural practices such as manure removal, while less that 5% of respondents released beneficial insects to manage barn flies. In this same survey, 52% of respondents selected flies on pastured cattle as being the most difficult pest to control and 56% indicated pasture flies were the most likely to cause economic loss (Harrington et al. 1998). Additionally, dairy farmers reported using insecticides two to three times per month to manage flies on pastured cattle.

Several challenges currently face those seeking to effectively manage livestock pests today. Implementation of the 1996 federally mandated Food Quality Protection Act (FQPA) resulted in the removal of a number of commonly used livestock insecticide materials, such as dimethoate, naled and chlorpyrifos. In the last decade, relatively few new insecticides have been registered for use on livestock. Efforts by the Cornell University Veterinary Entomology research group have documented widespread insecticide resistance in house flies, a primary pest on livestock

operations (Kaufman, et al. 2001). In some cases, 100% of house flies treated with specific insecticides survived when treated with the legal application rate of insecticides. The combination of fewer insecticides available and an increased presence of insecticide resistance heighten the potential for effective pest management options.

To complicate matters, as suburban areas encroach on rural agricultural landscapes, emigration of pest flies to off-site locations can act as a community lightning rod creating a new set of challenges for those involved in animal agriculture. This results from potential public health concerns and nuisance complaints from neighboring communities.

Individuals relying upon a largely insecticide-based pest management strategy will find this tactic an inadequate approach to controlling these pests. With fewer insecticides available, prospects for new materials limited, insecticide resistance more prevalent, and urbanization of once rural areas becoming more common place, livestock producers will continue to face increased challenges with fly management in the future.

These issues highlight the need for producers to have the best information available to manage dairy cattle pests and to utilize a broad integrated approach that includes a variety of cultural, biological, physical and chemical tactics.

Adult learning research indicates producers are more likely to adopt targeted new practices when the educational design promotes small groups, open discussion, and experiential hands-on learning on the farm (Kolb 1984, Koontz et al. 1994, Richardson 1994, Rogers 1983). Having the IPM dairy field meetings on a local producer's farm and inviting the local dairy farmers creates a trusting atmosphere. Producers are more inclined to adopt new methods of pest control when they can see and do it on their own farm. A series of field meetings were held in Eastern NY to extend dairy cattle IPM information to better manage common nuisance and biting flies attacking animals on dairy pasture and in confinement areas.

Literature Cited:

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Objectives:

1. To increase the number of producers utilizing livestock IPM by increasing the number, awareness and IPM skill level of dairy producers and other agriculture professionals in the northeast.
2. Evaluation of producer adoption will provide indications on the effectiveness of current educational efforts and identify strengths, weaknesses and opportunities to improve on training approach, impact, and producer use of IPM methods.

Procedures:

Pasture and confinement dairy fly IPM meetings were designed to provide participants with an overview of Dairy and Beef Cattle IPM principles and practical approaches to managing common fly pests affecting animals on pasture of while in confinement. These presentations were followed by an in situ demonstration/hands-on experience. By actively engaging individuals through seeing and doing producers are more willing to adopt many of the new procedures and practices being taught on farms. I teamed with extension educators that have direct connection with producers in several areas of Eastern New York. Typical meeting agendas are in Appendices 1 and 2. Extension educator host collaborators were invited to select the dairy fly IPM topic that best met the current needs of their local clientele either: flies in and around confinement areas or flies affecting animals on pasture.

Results and Outcomes:

A total of 12 on-farm dairy IPM meetings were held in New York during 2012. Eastern NY meetings were held in: Jefferson County (Mannsville), Dutchess County (Millbrook), Herkimer County (Illion), Chenango County (Sherburne), Otsego County (Oneonta), Schoharie County (Warnerville), Oswego County (Pulaski), Clinton County (Peru), Rensselaer County (Schuylerville), Saratoga County (Saratoga), Madison County (Morrisville) and Oneida County (Oriskany). A total of 10 extension educators were directly involved in this outreach effort.

Table 1: Meetings conducted by date, location, audience and number of people attending.

Date	Topic	Location	Audience	Number of people
July 11	Dairy Cattle Pasture Fly IPM	Jefferson County	Producers	25
July 17	Dairy Cattle Pasture Fly IPM	Herkimer County	Producers	5
July 17	Pasture/Barn Fly IPM	Chenango County	Producers	6
July 19	Pasture/Barn Fly IPM	Otsego County	Produces	5

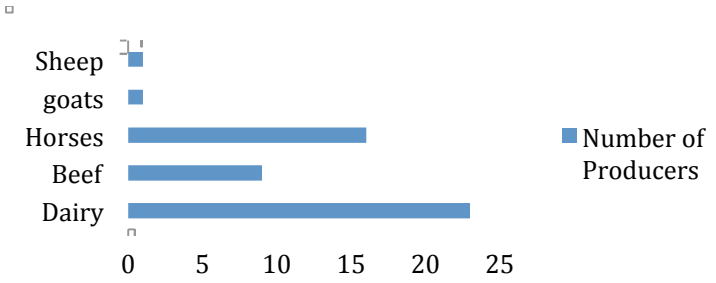
July 19	Pasture/Barn Fly IPM	Schoharie County	Producers	8
July 25	Horse and Cattle Pasture Fly IPM Demonstration/Meeting	Dutchess County	Horse Owners	5
July 25	Dairy Cattle Pasture Fly IPM	Oswego County	Producers	7
August 7	Barn Fly IPM	Clinton County	Producers and Vet	12
August 11	Horse Biting Fly Management	Saratoga County	Horse Owners	17
August 11	Dairy and Beef Cattle Pasture Fly IPM	Rensselaer County	Producers	5
August 15	Dairy Cattle Pasture Fly IPM	Madison County	Producers	10
August 24	Dairy Pasture IPM	Oneida County	Producers	5
			TOTAL	110

Participants completed program evaluations. The results of these evaluations follow. The actual questionnaire can be found in Appendix 3.

The 12 meetings offered in Eastern NY presented were on pasture and confinement fly IPM information. Most producers attending were from NY with additional participants from Vermont (1) and Kentucky (1). While the focus of the meetings was on dairy and beef cattle IPM a few participants who raised horse, sheep and goats also attended.

Figure 1 indicates the majority of participants raised either dairy or beef cattle with some horses, goats and sheep, also held on pasture. The majority of particpants were livestock producers with a few veterinarians also attending the meetings.

Figure 1: Percentage of respondents (n=50) on what the type of animals they pasture?



The dairy and beef producers owned and managed about 2,900 cattle and patured 2,300 acres. There were several horse owners that attended the meetings.

Horn, stable and face flies were the predominant fly species participants observed on their pastured livestock (Table 2). Participants indicated they felt face, stable and horn flies cause economic losses to their animals (Table 2).

Table 2: Responses to survey statements of flies on cattle	Horn fly	Stable fly	Face fly	Deer fly	Horse fly	House fly
What insect pest appears to be most common on your pastured animals?	70%	57%	83%	33%	26%	NA
What insect pests do you feel cause economic loss to your animals on pasture?	57%	33%	75%	25%	25%	NA
What insect pest appears to be most common on your animals in barns?	NA	75%	NA	NA	NA	50%
What insect pests do you feel cause economic loss to your animals in barns.	NA	75%	NA	NA	NA	50%

All participants responding to the meeting evaluation questionairre either highly agreed or moderately (100%) agreed that the meeting helped them better understand management of fly pests on pasture.

Prior to the meeting 81% of participants reported they did not use IPM thresholds in making fly management decisions. Following the meeting 83% of the participants indicated they would use IPM thresholds in their fly management.

Table 3: The percent of participants that use of IPM thresholds

	Used IPM Thresholds	Did not use IPM Thresholds
Before Meeting	19%	81%
After Meeting	83%	17%

Table 4 indicates what management practices particpants used before the meeting and what they might change after the training. During the pasture fly IPM meetings we presented and demonstated three traps effective against biting pasture fly pests: the Epps Biting Fly Trap, Horse Pal Horse Fly Trap, and the Alsynite Biting Fly Trap (see photos below of the traps presented). Many producers indicated prior to the meeting, they did not use pesticide free fly trapping technology as a means to manage pasture fly pests on pasture. Producers did not use the Alsynite, EPPs, Horse Pal or the walk through traps (insecticide free) before the meeting. Both conventional and certified organic producers were interested in use of these biting fly traps. After the training 45% to 75% (depending on the trap) of the producers stated they would consider using traps to enhance pasture fly management. Organically certified repellents were used by 63% of the producers before the meeting. They stated that the repellents did seem to keep flies off the cattle. One hundred percent of the producers used sanitation to help control flies around and in the barn. About 88 percent of the producers attending the barn fly IPM meetings released parasitoids as a means to control house flies. After the meetings 100% of the producers stated they would purchase and release parasitoids for barn fly control.

Table 4: The percent of respondents (n=40) indicating specific fly management practices used prior to this meeting and what they will use (or consider using) after this meeting.

	Before		After	
	Yes	No	Yes	No
Epps Trap (non-toxic)	0%	100%	45%	55%
Horse Pal Trap (non-toxic)	0%	100%	75%	25%
Alsynite Trap (non-toxic)	0%	100%	50%	50%
Walk Through Trap (non-toxic)	0%	100%	70%	30%
Repellents (non-toxic)	63%	37%	65%	35%
Sanitation (non-toxic)	100%	0%	100%	0%
Parasitoids (non-toxic)	88%	12%	100%	0%
Glue Traps(non-toxic)	63%	37%	83%	17%
Back rubbers (Pesticides)	20%	80%	39%	71%
Pour-on (Pesticides)	61%	39%	72%	28%
Feed Through (Pesticides)	35%	65%	28%	72%
Ear Tag (Pesticides)	22%	78%	20%	80%
Residual Insecticides(Pesticides)	57%	43%	57%	43%

Alsynite Biting Fly Trap for stable fly management

Horse Pal Horse Fly Trap

	
Epps Biting Fly Trap	Walk-Through Fly Trap

As a result of the meetings 70% of the participants stated that they would reduce the use of insecticides on cattle.

Table 4: Comments made by participants responding to:
"Please indicate how this meeting might have improved you fly management practices?"

increase trapping
More horse info
Handouts and traps
More mechanical use of fly control;
Showing the traps
Behavior knowledge of flies
Will use traps appropriate to flies
More fly management knowledge
Keep things cleaned up
More horse info
Handouts and traps
More mechanical use of fly control;
Showing the traps
Behavior knowledge of flies
Will use traps appropriate to flies
More fly management knowledge
Keep things cleaned up
Use traps
Clean in areas where flies produce
Fly traps
Pasture Walk
A better understanding of what causes fly issues
Information on dung beetle-first I have seen them.
digging in manure

How to make the cows more comfortable
Checking for different flies on cows
Better understanding of different flies
Gave me new ideas to try
Leaning about the habits of flies
More aware of problem flies
Can Id different flies
Understanding lifecycles and thresholds
I know that traps can help
Use traps
Clean in areas where flies produce

Table 5**:** Comments made by participants responding to: "What did you like most about this meeting?"

easy to use traps
The traps in use
all of it
Biology and lifecycles
Hands-on
Demonstration of traps
Pasture Walk
What flies impact the cows
informal setting
good charts and traps
very informative, good handouts, good presenter, easy to talk too
Talk with other farmers

Summary

Dairy fly IPM meetings were held in Jefferson County (Mannsville), Dutchess County (Millbrook), Herkimer County (Illion), Chenango County (Sherburne), Otsego County (Oneonta), Schoharie County (Warnerville), Oswego County (Pulaski), Clinton County (Peru), Rensselaer County (Schuylerville), Saratoga County (Saratoga), Madison County (Morrisville) and Oneida County (Oriskany) counties in New York. These events were successful in sharing dairy cattle IPM information with 110 participants to them help learn dairy biting and nuisance fly IPM principles and applied practices. The meetings were held on farms and employed an experiential learning approach with hands-on opportunities. Farmers preferred the on-farm classroom environment and were very willing to interact. Producer responses indicated they greatly appreciated the interactive and participatory learning approach of these meetings personalized to their specific farming environment. As a result producers stated they were going to use economic thresholds to better manage flies on animals as a result of knowledge gained through participation in these meetings. They also stated that they would consider using pasture

fly traps to potentially reduce insecticide use on the farm. Producers (100%) indicated they would use of parasitoids for barn fly control after they attended the meetings. Participants expressed a better understanding of the importance of scouting and evaluating thresholds. Producers and extension personnel expressed enthusiasm and interest in having more meetings in dairy fly IPM and learning IPM approaches to manage arthropod pests affecting several other livestock species in the future.

Key Words: Stable fly, house fly, face fly, horn fly, deer fly, horse fly, dairy, cattle, IPM, integrated pest management, on-farm education.

Appendix 1: Flies Affecting Animals on Pasture Meeting Agenda

(Hour 1)

-Conduct a fun "Pasture Fly Quiz" with Participant

Importance aspect of Pasture Fly IPM:

-Animal Health,
-Economic Impacts
-Population Growth
-Pesticide Resistance
-Food Quality and Protection Act
-On / Off Site fly emigration and other effects

Identification and Biology of Horn Flies, Face Flies and Stable Flies.

-Similarities and Differences
-Management lies within the Biology for the flies
-All flies are not created equal - other potential pests

Integrated Management

-Monitoring Techniques & Threshold Guides
- Fly Trapping Technology (What can they do?)
-Natural Enemies are They Effective?
-Chemical Control, back-rubbers, sprays, ear tags
-Insecticide Resistance Management
-Organic repellent Sprays-Do they Work?

Pasture Walk (1 Hour)

-Bio-security Issues
-Overview of Farm / Animal Production operation -host farmer or CCE personnel
-Pasture walk with eyes on fly managements issues, challenges, opportunities, how-to's, where's, whys, hands-on demonstration(s), other FAQ's
- Discussion
-Review answers to Pasture Fly Quiz

Appendix 2. Confinement Fly IPM Meeting Agenda

Introduction to Livestock IPM Confinement Area House and Stable Fly Pests
(1 Hour)

-Barn Fly Quiz

-Importance aspect of Pasture Fly IPM:
- -Animal Health,
- -Economic Impacts
- -Population Growth
- -Pesticide Resistance
- -Food Quality and Protection Act
- -On / Off Site fly emigration and other effects

-Identification and Biology of House Flies and Stable Flies.
- -Similarities and Differences
- -Management lies within the Biology for the flies
- -All flies are not created equal - other potential pests

-Integrated Management

Sanitation, Sanitation, Sanitation
- -Monitoring Techniques & Threshold Guides
- -Baits, Sticky Ribbons / Tapes, Traps
- -Natural Enemies, Augmenting natural enemy populations
- -Chemical Control
  - -Insecticide Resistance Management
- -Organic Management

Barn and Facilities Walk (1 Hour)
- -Bio-security Issues
- -Overview of Farm / Animal Production operation -host farmer or CCE personnel
- -Pasture walk with eyes on fly managements issues, challenges, opportunities, how-to's, where's, whys, hands-on demonstration(s), other FAQ's - Discussion
- -Review answers to Barn Fly Quiz

Appendix 3 – Blank Questionairre

NYS IPM Pastured Cattle –Fly Management Evaluation

1. What type of animals do you pasture?
   __Dairy Cattle, ___ Beef Cattle, ___ Horses, _____ Other
2. What is the size of your herd? _____ How many acres do you pasture _____?
3. What insect pest appears to be most common on your pastured animals?
   Horn Fly ___, Stable Fly ___, Face Fly ___, Deer Fly ___, Horse Fly___ Other (name) ____
4. What insect pests do you feel cause economic loss to your animals?
   Horn Fly ___, Stable Fly ___, Face Fly ___, Deer Fly ___, Horse Fly___ Other (name) ____
5. Do you use action thresholds to determine if flies on you animals need to be managed?
   Before this meeting After this meeting

Yes ___, No ___ Yes ___, No ___

6. What fly management practices did you use prior to this meeting and what will you use (or consider using) after this meeting for pastured animals:

		Before the meeting check only 1 per column	After the meeting
a.	Epps Trap	Yes ____ No ____	Yes ____ No ____
b.	Horse Pal Trap	Yes ____ No ____	Yes ____ No ____
c.	*Alsynite Trap*	Yes ____ No ____	Yes ____ No ____
d.	Walk Through Trap	Yes ____ No ____	Yes ____ No ____
e.	Repellents	Yes ____ No ____	Yes ____ No ____
f.	Back rubbers	Yes ____ No ____	Yes ____ No ____
g.	Pour-on	Yes ____ No ____	Yes ____ No ____
h.	Feed through	Yes ____ No ____	Yes ____ No ____
i.	Ear tags	Yes ____ No ____	Yes ____ No ____

7. Will you reduce the use of insecticides because of this meeting?

   Yes _____ No _____

8. This meeting helped me better understand the fly management issues of cattle on pasture.

Highly agree	Moderately agree	Not Sure	Moderately Disagree	Strongly Disagree
_____	_____	_____	_____	_____

9. Please indicate how this meeting might have improved you pasture fly management practices?

10. What did you like most about this meeting?

11. Where can we improve on research based information to better meet your needs as a producer?

12. What state do you farm in? _____

NYS IPM Barn Fly Management Evaluation

1. What type of livestock occupies barn space?
   ___Dairy Cattle, ___ Beef Cattle, ___ Horses, _____ Other
2. What is the size of your herd? _____
3. What insect pest appears to be most common in your barn.
   Stable Fly ___, House Fly _____ Other (name) ____
4. What insect pests do you feel cause economic loss to your animals?
5. Stable Fly ___, House Fly _____ Other (name) ____

6. Do you use action thresholds to determine if flies on your animals need to be managed?
   Before this meeting After this meeting

   Yes ___, No ___ Yes ___, No ___

7. What fly management practices did you use prior to this meeting and what will you use (or consider using) after this meeting:

		Before the meeting	After the meeting
a.	Sanitation	Yes ____ No ____	Yes ____ No ____
b.	Parasitoids	Yes ____ No ____	Yes ____ No ____
c.	*Alsynite Trap*	Yes ____ No ____	Yes ____ No ____
d.	Repellents	Yes ____ No ____	Yes ____ No ____
e.	Sticky Glue Traps	Yes ____ No ____	Yes ____ No ____
f.	Pour-on	Yes ____ No ____	Yes ____ No ____
g.	Feed through	Yes ____ No ____	Yes ____ No ____
h.	Ear tags	Yes ____ No ____	Yes ____ No ____
i.	Residual Insecticides	Yes ____ No ____	Yes ____ No ____

8. Will you reduce the use of insecticides because of this meeting?

   Yes _____ No _____

9. This meeting helped me better understand the fly management issues of cattle in the barn.
   Highly agree Moderately agree Not Sure Moderately Disagree Strongly Disagree

   _____ _____ _____ _____ _____

10. Please indicate how this meeting might have improved your fly management practices?

11. What did you like most about this meeting?

12. Where can we improve on research based information to better meet your needs as a producer?

13. What state do you farm in? _____